

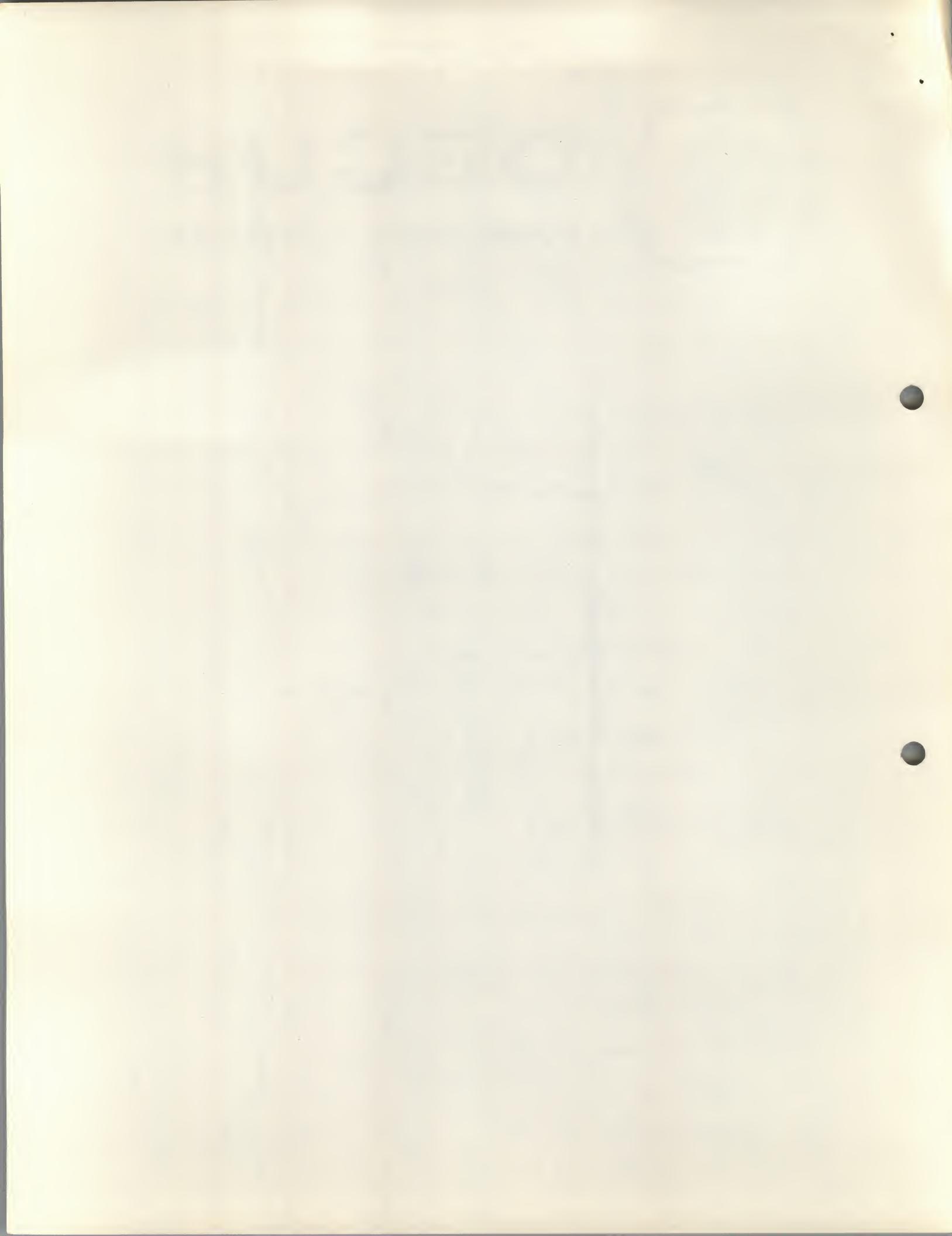


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| DECUS NO. | 8-358 |
| TITLE | CARD READER PATCH |
| AUTHOR | Peter Lincoln Barnett |
| COMPANY | Dubner Computer Systems New York, New York |
| DATE | September 11, 1970 |
| SOURCE LANGUAGE | PAL |

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CARD READER PATCH

DECUS Program Library Write-up

DECUS NO. 8-358

ABSTRACT:

This patch enables a program which uses paper tape or teletype to use a card reader with no further modification. It is used as a subroutine which is called each time a character is to be read.

The patch operates as follows:

It reads a card into a buffer, converts the codes to ASCII, and terminates them with a carriage return - line feed. It returns one character each time it is called until the buffer is emptied, at which point the next card is read.

HOW TO USE IT:

This program may be located in any page of any memory field.

In order to use it simply replace the teletype or high-speed reader commands with a jump to the subroutine. For example:

| | | |
|---------|---------|-----------|
| KSF | | SKP |
| JMP .-1 | becomes | BEGIN |
| KRB | | JMS I .-1 |

Note that the interrupt system must be disabled.

POSSIBLE MODIFICATIONS:

The BCD character set is not wholly compatible with the ASCII character set. The numbers and letters are standard but the special characters depend upon the convention or keypunch used. For this reason the correspondence between the two must be determined according to the type of programming one does. This program is supplied with a conversion table designed for PAL and FORTRAN. However, because of the way it works, it may be easily changed for other uses. In order to understand how to do this it is necessary understand the workings of the BCD to ASCII conversion table.

This table is in the form of an array, packed two elements per word. Array position refers to the BCD code and the contents of that position refers to the ASCII code. For example, the BCD code for the letter A is 61. In order to find the ASCII code, look up the 61st element of the table which is the right half of the 30th word. This number is found to be 41. Adding 240 to this yields 301, the ASCII code for A. Thus, to change a correspondence, simply change that element in the table to the proper code less 240.

For example, suppose you want to recognize a 2-8 punch as a colon.

Note that a 2-8 punch will be interpreted as the BCD code 12.

The 12th position of the conversion table is the left half of the sixth word which is 00, indicating that a BCD 12 will be interpreted as an ASCII blank. To change it to a colon simply replace the 00 with a 32 which is the ASCII code for colon minus 240. In this way the character set may be modified to suit individual needs.

CERTIFICATION:

This program or modifications of it have been used for six months with no apparent errors.

Please address any comments or questions about this program to:

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BACK 0255
BEGIN 0200
BUFF 0331
BUFFAD 0410
BUFFER 0336
COLUMN 0332
COUNT 0333
CR 0300
EMPTY 5277
ENTER 0337
ENTRY 0211
FLD 0216
LF 0303
LIST 0347
LOOKUP 0315
MASK 0340
M39 0341
M80 0342
NCDF 0343
NCR 0344
NLF 0345
P240 0346
RD 0307
RDCARD 0221
RETURN 5216
SEND 0267
SINIST 0332
START 0334
TEMP 0335
TWOCOL 0232

/ THIS PROGRAM SIMULATES A PAPER TAPE READER
/ WITH A CARD READER. IT MAY BE LOCATED IN ANY
/ MEMORY FIELD. IT ASSUMES THAT IT HAS BEEN
/ CALLED FROM FIELD ZERO AND THAT THE INTERRUPT IS
/ OFF. TO CALL IT FROM OTHER FIELDS CHANGE FLD+1
/ PETER BARNETT 12/17/69

/ CARD READER COMMANDS

RCSF=6631
RCRA=6632
RCSD=6671
RCSE=6672
RCRD=6674
FIXTAB

0200 0000 BEGIN, 0
0201 7300 CLA CLL
0202 6214 RDF /SAVE DATA FIELD IN ORDER TO RETURN
0203 1343 TAD NCDF / WITH SAME DATA FIELD AS ENTRY.
0204 3216 DCA FLD
0205 6224 RIF
0206 1343 TAD NCDF
0207 3210 DCA .+1
0210 0000 0
0211 5212 ENTRY, JMP .+1 /POINTER TO THE FOLLOWING MODES -
0212 5221 JMP RDCARD / 1. OUT OF DATA -- READ A CARD

| | | | | |
|------|------|---------|----------|--------------------------------------|
| 0213 | 5267 | JMP | SEND | / 2. SEND DATA FROM CARD ALREADY REB |
| 0214 | 5300 | JMP | CR | / 3. CARD FINISHED -- SEND CAR. RETN |
| 0215 | 5303 | JMP | LF | / 4. SEND LINE FEED & RESET POINTER |
| 0216 | 0000 | FLD, | 0 | |
| 0217 | 6202 | CIF | | |
| 0220 | 5600 | JMP I | BEGIN | |
| 0221 | 6674 | RDCARD, | RCRD | |
| 0222 | 1336 | TAD | BUFFER | |
| 0223 | 3331 | DCA | BUFF | |
| 0224 | 1341 | TAD | M39 | |
| 0225 | 3333 | DCA | COUNT | |
| 0226 | 1347 | TAD | LIST | /SET LOOKUP ROUTINE |
| 0227 | 3334 | DCA | START | / TO SEARCH ASCII TABLE |
| 0230 | 6672 | RCSE | | |
| 0231 | 5230 | JMP | .-1 | |
| 0232 | 4307 | TWOCOL, | JMS | RD |
| 0233 | 7106 | CLL RTL | | /STORE THE CARD COLUMNS |
| 0234 | 7006 | RTL | | / PACKED TWO COLUMNS |
| 0235 | 7006 | RTL | | / PER WORD -- ODD COLUMNS |
| 0236 | 3332 | DCA | SINISTER | / IN THE LEFT HALF, |
| 0237 | 4307 | JMS | RD | / EVEN IN THE RIGHT. |
| 0240 | 1332 | TAD | SINISTER | |
| 0241 | 3731 | DCA I | BUFF | |
| 0242 | 2331 | ISZ | BUFF | |
| 0243 | 2333 | ISZ | COUNT | |
| 0244 | 5232 | JMP | TWOCOL | |
| 0245 | 1336 | TAD | BUFFER | /SET LOOKUP ROUTINE |
| 0246 | 3334 | DCA | START | / TO USE CARD BUFFER |
| 0247 | 6671 | RCSD | | |
| 0250 | 5247 | JMP | .-1 | /WAIT UNTIL CARD IS PAST |
| 0251 | 6674 | RCRD | | |
| 0252 | 2211 | ISZ | ENTRY | /ADVANCE POINTER |
| 0253 | 1342 | TAD | M80 | |
| 0254 | 3333 | DCA | COUNT | |
| 0255 | 1333 | BACK, | TAD | COUNT |
| 0256 | 7040 | CMA | | /BACK UP TO FIRST |
| 0257 | 4315 | JMS | LOOKUP | / NONBLANK COLUMN |
| 0260 | 7640 | SZA CLA | | / SO THAT TRAILING |
| 0261 | 5266 | JMP | SEND-1 | / BLANKS ON THE |
| 0262 | 2333 | ISZ | COUNT | / CARD WILL NOT |
| 0263 | 7410 | SKP | | / BE TRANSMITTED. |
| 0264 | 5277 | EMPTY | | |
| 0265 | 5255 | JMP | BACK | |
| 0266 | 3332 | DCA | COLUMN | |
| 0267 | 1332 | SEND, | TAD | COLUMN |
| 0270 | 4315 | JMS | LOOKUP | |
| 0271 | 1346 | TAD | P240 | |
| 0272 | 2332 | ISZ | COLUMN | |
| 0273 | 2333 | ISZ | COUNT | /ADVANCE POINTER WHEN |
| 0274 | 7410 | SKP | | / THE LAST NONBLANK COLUMN |
| 0275 | 2211 | ISZ | ENTRY | / HAS BEEN TRANSMITTED |
| 0276 | 5216 | RETURN | | |
| 0277 | 2211 | ISZ | ENTRY | /BLANK CARD |
| 0300 | 1344 | CR, | TAD | NCR |
| 0301 | 2211 | ISZ | ENTRY | /ADVANCE POINTER |
| 0302 | 5216 | RETURN | | |

| | | | | | |
|------|------|-----------|---------------------|---------|-------------------------------------|
| 0303 | 1337 | LF, | TAD | ENTER | / RESTORE POINTER TO READ |
| 0304 | 3211 | | DCA | ENTRY | / NEW CARD NEXT TIME |
| 0305 | 1345 | | TAD | NLF | |
| 0306 | 5216 | | RETURN | | |
| 0307 | 0000 | RD, | 0 | | |
| 0310 | 6631 | | RCSF | | / SUBROUTINE READS ONE |
| 0311 | 5310 | | JMP | .-1 | / CARD COLUMN AND RETURNS |
| 0312 | 6632 | | RCRA | | / WITH EQUIVALENT ASCII |
| 0313 | 4315 | | JMS | LOOKUP | / VALUE - 240 IN AC (IN |
| 0314 | 5707 | | JMP I | RD | / ORDER TO GET 6-BIT CODES). |
| 0315 | 0000 | LOOKUP, | 0 | | |
| 0316 | 7110 | | CLL RAR | | / SUBROUTINE LOOKS UP ELEMENTS |
| 0317 | 1334 | | TAD | START | / IN AN ARRAY STARTING AT "START" |
| 0320 | 3335 | | DCA | TEMP | / AND PACKED TWO ELEMENTS PER WORD. |
| 0321 | 1735 | | TAD I | TEMP | / ARRAY POSITION IS DETERMINED BY |
| 0322 | 7430 | | SZL | | / NUMBER IN AC (COUNTING FROM 0) |
| 0323 | 5327 | | JMP | .+4 | / UPON ENTRY. |
| 0324 | 7112 | | CLL RTR | | |
| 0325 | 7012 | | RTR | | |
| 0326 | 7012 | | RTR | | |
| 0327 | 0340 | | AND | MASK | |
| 0330 | 5715 | | JMP I | LOOKUP | |
| | | | EMPTY=JMP CR-1 | | |
| | | | RETURN=JMP FLD | | |
| | | | / V A R I A B L E S | | |
| 0331 | 0000 | BUFF, | 0 | | |
| | | COLUMN, | | | |
| 0332 | 0000 | SINISTER, | 0 | | / LEFT |
| 0333 | 0000 | COUNT, | 0 | | |
| 0334 | 0000 | START, | 0 | | |
| 0335 | 0000 | TEMP, | 0 | | |
| | | | / C O N S T A N T S | | |
| 0336 | 0410 | BUFFER, | BUFFAD | | |
| 0337 | 5212 | ENTER, | JMP | ENTRY+1 | |
| 0340 | 0077 | MASK, | 77 | | |
| 0341 | 7730 | M39, | -50 | | |
| 0342 | 7660 | M80, | -120 | | |
| 0343 | 6201 | NCDF, | CDF | | |
| 0344 | 0215 | NCR, | 215 | | |
| 0345 | 0212 | NLF, | 212 | | |
| 0346 | 0240 | P240, | 240 | | |
| 0347 | 0350 | LIST, | LIST+1 | | |
| 0350 | 0021 | | / 1 | | BCD TO |
| 0351 | 2223 | | / 2 3 | | |
| 0352 | 2425 | | / 4 5 | | ASCII |
| 0353 | 2627 | | / 6 7 | | |
| 0354 | 3031 | | / 8 9 | | CONVERSION |
| 0355 | 0035 | | / = | | |
| 0356 | 0707 | | / ' ' | | TABLE |
| 0357 | 3500 | | / = | | |
| 0360 | 2017 | | / 0 / | | |
| 0361 | 6364 | | / S T | | |
| 0362 | 6566 | | / U V | | |
| 0363 | 6770 | | / W X | | |
| 0364 | 7172 | | / Y Z | | |
| 0365 | 0014 | | / , | | |
| 0366 | 1000 | | / (| | NOTE THAT EBCDIC |
| 0367 | 0000 | | /) | | () + = ' ARE OK |

| | | | |
|------|------|-----------|-------|
| 0370 | 1552 | 1552 | / - J |
| 0371 | 5354 | 5354 | / K L |
| 0372 | 5556 | 5556 | / M N |
| 0373 | 5760 | 5760 | / O P |
| 0374 | 6162 | 6162 | / Q R |
| 0375 | 0004 | 0004 | / \$ |
| 0376 | 1211 | 1211 | / *) |
| 0377 | 0000 | 0000 | / |
| 0400 | 1341 | 1341 | / + A |
| 0401 | 4243 | 4243 | / B C |
| 0402 | 4445 | 4445 | / D E |
| 0403 | 4647 | 4647 | / F G |
| 0404 | 5051 | 5051 | / H I |
| 0405 | 0016 | 0016 | / . |
| 0406 | 1110 | 1110 | /) (|
| 0407 | 1300 | 1300 | / + |
| 0410 | 0000 | BUFFAD, 0 | |

/CARD BUFFER
/ ALLOW 40 DECIMAL LOCATIONS.

